



Mulch-Till Residue Management

Conservation Practice Job Sheet

329B

Natural Resources Conservation Service (NRCS)

August 1998

Landowner _____



What is Mulch-Till?

Mulch-till systems manage the amount, orientation, and distribution of crop and other residue on the soil surface year-round, while growing crops where the entire soil surface is tilled prior to or during the planting operation. Residue is partially incorporated using chisels, sweeps, field cultivators, or similar implements.

Purposes

Mulch-till systems can be designed to accomplish one or more of the following conservation purposes:

- Reduce water erosion
- Reduce wind erosion
- Maintain or increase soil organic matter and soil tilth
- Conserve soil moisture

- Manage snow to increase plant available moisture
- Provide food and escape cover for wildlife

Secondary Benefits

- Water quality improves both onsite and offsite.
- Air quality improves both onsite and offsite.
- Sedimentation is reduced.

Conservation Management Systems

Mulch tillage is normally used as a component of a conservation management system. It should be used in conjunction with Crop Rotation, Nutrient Management, Pest Management, the Buffer Practices, and other practices needed on a site specific basis to address natural resource concerns and the landowner's objectives. Major roles of the mulch-

till component of a system include providing soil protection, reducing runoff, and improving soil tilth by allowing the soil to accumulate more organic matter.

Practice Specifications

Practice specifications are provided to assure the mulch-till system meets the resource needs and producer's objectives. The specifications are based on the amount, timing, and orientation of crop residue left on the soil surface. These requirements are recorded in table 1. Supporting information may be included in tables 2 and 3. Residue retention calculations recorded in table 3 are estimates to determine whether the planned number, sequence, and timing of farming operations will leave the specified amounts of residue. (Residue calculations are estimates highly dependent on such variables as operating speed, depth, field conditions, and adjustments.)

General Specifications

applicable to all practice purposes

- Residue to be retained on the field shall be uniformly distributed. Combines or other harvesting machines shall be equipped with spreaders capable of spreading residue over at least 80 percent of the combine header width.
- Secondary removal of crop residue by baling or grazing shall be limited to retain the amount of residue needed to achieve the intended purpose(s).
- Residue shall not be burned.
- Anhydrous injectors, manure injectors, and similar equipment may need to be modified to operate in high residue situations.
- Tillage implements, such as field cultivators, chisels, or similar tools, should be selected and operated to leave a specified amount of residue on the soil surface.
- Planting implements should be equipped with coulters and disk openers designed to cut through surface residue.
- Row cleaners may be attached to the planters to move residue out of the row area and help warm and dry the seedbed.

Additional Specifications

applicable to purposes identified during planning

Reduce erosion from wind and water, and improve water and air quality

The specified amount, timing, and orientation of residue will be in accordance with site specific data recorded in table 1. Current wind and water erosion technology will be used to establish minimum specifications.

Maintain or increase soil organic matter content

Tillage aerates the soil and increases decomposition of organic matter. Mulch-till reduces tillage and leaves the necessary amount of residue on or near the soil surface for soil improvement. The required amounts of residue for soil protection are specified in table 1. Tables 2 and 3 can be used to plan and record the crops, field operations, and management necessary to achieve a positive trend in soil organic matter content based on the NRCS Soil Condition Index (SCI) procedure described in the National Agronomy Manual.

Conserve moisture

Residue shall be evenly distributed and maintained on the soil surface during the growing season or fallow period to retain soil moisture for crop use by enhancing infiltration and reducing evaporation. A minimum of 50 percent surface residue cover is required to significantly reduce surface evaporation.

Manage snow

Maintain 6 inches standing stubble over winter to catch and retain snow cover. Operations that flatten or partly bury residue should be delayed until spring to achieve the stubble requirements for this purpose.

Provide food and cover for wildlife

The amount of residue, height of stubble, and time requirements to meet the minimum needs of the target wildlife species are specified in table 1. This information is based on a wildlife habitat index procedure.

Record planned practice specifications in table 1. Tables 2 and 3 and figures 1 and 2 are for optional use when more detailed planning or design information is needed.

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Mulch-Till Design and Specification Worksheet

Farm:

Field:

Practice purpose (check one or more that apply)

1	Reduce water erosion	5	Improve wildlife habitat (food and cover)
2	Conserve soil moisture	6	Manage snow cover for plant available water
3	Improve soil condition	7	Other
4	Reduce wind erosion		

Table 1 Specifications (and application record)

Tract/ field	Crop to be planted	Previous crop residue	Orientation standing or flat (S or F)	Height in inches	Critical season(s)	Row width inches	Pounds of residue*		Percent residue cover	
							Planned	Applied	Planned	Applied

Notes: If residue is managed for wildlife benefits, describe planned wildlife provisions. Also use this space to describe row direction, grade restrictions, or other site specific requirements.

Soil Conditioning Index (SCI) available and used *

Yes

No

Calculated SCI value:

Notes concerning soil quality:

*SCI provides an indication of the soil condition trend based on planned management. Positive values indicate an upward trend. Negative values indicate a downward trend. The values are based on how crops and management affect soil organic matter content. Refer to tables 2 and 3.

Table 2 Design worksheet for estimating crop residue produced (for planned rotation)

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
Crop	Harvest units	lb/unit	Yield	Residue/yield ratio	Est. lb residue/ac	Estimated percent ground cover	Instructions to estimate values for column 6 and 7
							<p>Multiply columns 3x4x5 to estimate total lb of residue available after harvest.</p> <p>Figure 1 can be used to convert pounds of residue (column 6) to percent ground cover (column 7).</p> <p>Use local values for column 5.</p>

Notes:

Information in column 7 is used in table 3 as an estimate of beginning ground cover for each crop in the rotation.

Mulch-Till Design and Specification Worksheet

Table 3 Design worksheet for residue budget

[illegible]

Notes:

*Local residue retention values are recorded on figure 2.

Figure 1 Residue lb/percent cover conversion

Percent cover	Corn	Soybeans	Cotton	Grain sorghum	Small grains
10%	250	250	400	300	250
20%	600	400	1,000	650	400
30%	950	600	1,600	1,050	600
40%	1,400	850	2,300	1,550	850
50%	1,850	1,200	3,200	2,100	1,200
60%	2,400	1,600	4,150	2,700	1,550
70%	3,300	2,100	5,300	3,600	2,100
80%	4,400	2,800	6,900	4,800	2,750
90%	6,050	3,900		6,750	3,850

Adapted from table D-4 and Figure 5-4, ARS Ag Handbook 703

Notes:

Figure 2 Machinery table

[illegible]